We Claim:

1. A method for correcting room acoustics at multiple-listener positions, the method comprising:

measuring a room acoustical response at each listener position in a multiple-listener environment;

warping each of the room acoustical response measured at said each listener position;

determining a general response by computing a weighted average of the warped room acoustical responses;

generating a low order spectral model of the general response;

obtaining a warped acoustic correction filter from the low order spectral model; and

unwarping the warped acoustic correction filter to obtain a room acoustic correction filter;

wherein the room acoustic correction filter corrects the room acoustics at the multiple-listener positions.

2. The method according to claim 1, further including the step of generating a stimulus signal for measuring the room acoustical response at each of the listener positions.

RulE 1.126 3 ~~5.~~ The method according to claim 1, wherein the general response is determined by a pattern recognition method.

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4 ~~6~~. The method according to claim 5, wherein the pattern recognition method is at least one of a hard c-means clustering method, a fuzzy c-means clustering method, or an adaptive learning method.

5 ~~8~~. The method according to claim 1, wherein the warping is achieved by means of a bilinear conformal map.

6 ~~9~~. The method according to claim 1, wherein the spectral model includes a t least one of a Linear Predictive Coding (LPC) model or a pole-zero model.

7 ~~11~~. The method according to claim 1, wherein the warped acoustic correction filter is the inverse of the low order spectral model.

8 ~~12~~. A method for generating substantially distortion-free audio at multiple-listeners in an environment, the method comprising:

measuring acoustical characteristics of the environment at each expected listener position in the multiple-listener environment;

warping each of the acoustical characteristics measured at said each expected listener position;

generating a low order spectral model of each of the warped acoustical characteristics;

obtaining a warped acoustic correction filter from the low order spectral model;

unwarping the warped acoustic correction filter to obtain a room acoustic correction filter;

filtering an audio signal with the room acoustical correction filter; and

transmitting the filtered audio from at least one loudspeaker, wherein the audio signal received at said each expected listener position is substantially free of distortions.

Rule 1.126 9 ~~13~~. The method according to claim 12, further including the step of determining a general response by a pattern recognition method.

10 ~~14~~. The method according to claim 13, wherein the pattern recognition method is at least one of a hard c-means clustering method, a fuzzy c-means clustering method, or an adaptive learning method.

11 ~~15~~. The method according to claim 12, wherein the warping is achieved by a bilinear conformal map.

12 ~~16~~. The method according to claim 12, wherein the spectral model includes at least one of a Linear Predictive Coding (LPC) model or a frequency weighted pole-zero model.

13 ~~17~~. The method according to claim 12, wherein the warped acoustic correction filter is the inverse of the general response.

14 ~~18~~. A system for generating substantially distortion-free audio at multiple-listeners in an environment, the system comprising:

a filtering means for performing multiple-listener room acoustic correction, the filtering means formed from:

(i) warped room acoustical responses, wherein the room acoustical responses are measured at each of an expected listener position in a multiple-listener environment;

(ii) a weighted average response of the warped room acoustical responses;

(iii) a low order spectral model of the weighted average response;

(iv) a warped filter formed from the low order spectral model; and

(v) an unwarped room acoustic correction filter obtained by unwarping the warped filter;

wherein an audio signal, filtered by the filtering means comprised of the room acoustic correction filter, is received substantially distortion-free at each of the expected listener positions.

Ry/E 1.126 15 ~~19~~. The system according to claim 18, wherein the weighted average response is determined by a pattern recognition means.

16 ~~20~~. The system according to claim 19, wherein the pattern recognition means is at least one of a hard c-means clustering system, a fuzzy c-means clustering system, or an adaptive learning system.

17 ~~21~~. The system according to claim 18, wherein the warping is achieved by an all-pass filter chain.

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18 ~~22.~~ The system according to claim 18, wherein the warped filter includes an inverse of the lower order spectral model.

19 ~~23.~~ The system according to claim 18, wherein the spectral model includes at least one of a Linear Predictive Coding (LPC) model or a frequency weighted pole-zero model.

20 ~~24.~~ A method for correcting room acoustics at multiple-listener positions, the method comprising:

warping each room acoustical response, said each room acoustical response obtained at each expected listener position;

clustering each of the warped room acoustical response into at least one cluster, wherein each cluster includes a centroid;

forming a general response from the at least one centroid;

inverting the general response to obtain an inverse response;

obtaining a lower order spectral model of the inverse response;

unwarping the lower order spectral model of the inverse response to form the room acoustic correction filter;

wherein the room acoustic correction filter corrects the room acoustics at the multiple-listener positions.

21 ~~25.~~ The method according to claim 24, wherein the warping is achieved by a bilinear conformal map.

22 ~~26.~~ The system according to claim 24, wherein the spectral model includes a frequency weighted pole-zero model.